Nuclear medicine increasing patient safety at a lower cost

By Yossi Srour

Over the past decade, much focus has been put on the high dose in nuclear medicine – and subsequent efforts to lower the dose. Devastating stories in the news media have called attention to it, and well-known initiatives like Image Wisely and Image Gently have, for years, been advocating for increased safety and lower dose.

As of Jan. 1, 2014, the American Society of Nuclear Cardiology guidelines to reduce total patient radiation exposure to less than 9 mSv per entire SPECT/PET myocardial perfusion imaging study in 50 percent of studies went into effect, and are the primary indication that nuclear medicine is looking to a safer future. Guidelines are often the first step before a standard is mandated. But it's not just the guidelines doing the talking; patients are also taking an increasingly active role in their health care – and that is extending to nuclear medicine.

Today, it is the norm for patients to be more educated about their health, to do research, and question medical solutions presented to them. When it comes to low-dose nuclear medicine, health care organizations across the country are already experiencing the influx of educated and informed patients who are aware of the high radiation exposure and asking for the lowest dose possible. This trend hasn't been ignored. At the approaching annual Society of Nuclear Medicine and Molecular Imaging conference, a unique Patient Education Day has been entirely dedicated to exploring issues and concerns from a patient perspective.

Low cost can equate to increased safety

Safer imaging means a lower dose. Hospitals and health systems need to identify solutions that will enable the lowest dose possible without compromising the image quality that physicians so much depend upon. When it comes to low dose, there are currently three available options. The first requires an investment in a brand new SPECT/CT camera. While physicians can acquire high-quality myocardial perfusion SPECT scans with half the radiopharmaceutical activity and with a half-time acquisition, at a capital investment of $500,000 and upwards per scanner, this solution is prohibitive for most.

There are, however, two options where increased patient safety equates to low cost. For some facilities, that solution is the implementation of a stress-only imaging protocol. In general, both the stress and rest parts of the exam are necessary, but for certain patients the stress-only part of the study can be done; as a result, radiation dose is cut nearly in half. But to do stress-only imaging well, attenuation correction is needed, and only a few labs have this capability.

For other facilities, the optimal solution for lowering dose and increasing safety is the implementation of vendor-neutral image reconstructive software. In addition to its low capital cost, which runs only five to 10 percent of that of a new SPECT camera, image reconstruction software is compatible with all models and manufacturing years of existing cameras, so larger facilities with multiple SPECT cameras can upgrade their entire department with one purchase. While the capital cost itself is low, there are also numerous other advantages that make the purchase a smart one. For starters, nuclear medicine imaging departments will also require a lower dose of technetium-99m. It can be as low as five and 15 mSv instead of 10 and 30 mSv for rest/stress – and can maintain its regular workflow with the same cameras, acquisition station and workstation. And physicians are pleased with the high image quality and diagnostic confidence even while decreasing dose by half, or even three-fourths; when decreasing scan time by half, or when decreasing both dose and time.

Educated patients will appreciate not only the lower dose, but also the shorter scan times that are possible, especially those patients who are very sick or uncomfortable with the procedure. For example, a gated stress myocardial perfusion study could be completed in as little as three minutes, and a rest SPECT acquisition under five minutes.

The decreased time is not only a value to patient health and comfort, but can also be used to increase patient throughput, in which case the implementation of image reconstruction software will not only prove to be a cost-effective means to reduce radiation exposure, but also to increase revenue. Low-dose and potential for increased revenue contribute to a win-win scenario.

Hospitals and imaging facilities are hard-pressed to make the best of available resources while prioritizing patient safety and adhering to the best industry practices. Engaged and educated patients are driving changes in all health care disciplines and nuclear medicine is no exception, with primary goals being safer high-quality imaging and increased comfort during a faster exam. Careful examination of available options will ensure the facility will end up with a solution that is the best fit for its staff, patient and budget needs.

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